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10/712,657	11/13/2003	Jiebo Luo	87007DMW	2589

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EXAMINER

KRASNIC, BERNARD

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/712,657	Applicant(s) LUO ET AL.	
	Examiner Bernard Krasnic	Art Unit 2624	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 November 2007.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. The Request for Continued Examination filed 11/05/2007 have been entered and made of record.
2. The Declaration under 37 C.F.R. 1.132 filed 10/09/2007 have been entered and made of record. Further discussions toward the declaration are addressed below.
3. The Applicant has canceled claim(s) 4.
4. The application has pending claim(s) 1-3 and 5-7.
5. Applicant's arguments with respect to claim(s) 1-3 and 5-7 have been considered but are moot in view of the new ground(s) of rejection because of the Request for Continued Examination (RCE).
6. Applicant's arguments filed 11/05/2007 have been fully considered but they are not persuasive.

The Applicant alleges, "A notable feature of Claim 1 ..." in page 5, "The Office Action cites the Vivarelli article ..." in page 5, and "Accordingly, the neural networks ..." in page 5, and states respectively that *firstly* the prior art references Tretter and Vivarelli alone or in combination do not suggest the amended claim 1 which now incorporates a more specific version of the limitations of original claim 4, "a Bayesian network

*configured to produce the final estimate of image class with evidence missing*". The Applicant *secondly* suggests that the accompanying Declaration under 37 C.F.R. 1.132 by one of the inventor's, Jiebo Luo, shows that the neural network of Tretter and the Bayesian neural network of Vivarelli both require a complete input set for computation which goes against the amended claim limitation that the Bayesian network is configured to produce a result even with evidence missing. *Firstly*, the Examiner acknowledges that the Vivarelli reference does not specifically suggest that Vivarelli's Bayesian neural network is configured to produce a result with evidence missing, however the Examiner disagrees and does believe that Tretter suggests a neural network configured to produce the final estimate of image class with evidence missing and therefore the Vivarelli reference is only used as a secondary reference to further suggest that Tretter's neural network may be a Bayesian neural network. Tretter teaches that Tretter's neural network consists of several nodes and that each node is configured to receive for example one meta-data [focusing distance for example] (see Tretter, paragraph 0029, lines 7-10). Tretter's number of nodes depends on the desired accuracy for the classification scheme that the neural network produces (see Tretter, paragraph 0033, lines 1-6) and Tretter gives an example of having a neural network consisting of six decision-making nodes for a specific desired accuracy (see Tretter, paragraph 0033, lines 1-6) and Tretter also suggests that the meta-data may consist of but not limited to an automatic gain setting, film speed, shutter speed, white balance, aperture/lens index, focusing distance, date, time, and flash/no flash [at least 9 different meta-data's] (see Tretter, paragraph 0008, lines 9-12). Therefore if Tretter wanted a

specific desired accuracy which required 6 nodes [each node requires one different meta-data such as focusing distance for example as discussed above], there would definitely be at least 3 different meta-data tags which would not be addressed and therefore the neural network would be missing at least 3 different meta-data tag evidence. Secondly in regards to the Declaration under 37 C.F.R. 1.132, the inventor Jiebo Luo starts by stating that the Vivarelli Bayesian neural network cannot perform its computations when any part of the data from the particular set of input information is missing [see Declaration, page 1, Point 6], but then clearly states that a conventional Bayesian network is trained to be able to perform when data of input information is missing [see Declaration, page 1, Point 7]. Therefore the inventor clearly admits that the amended limitation is conventional in that a Bayesian network may perform with evidence missing. Therefore claims 1-3, and 5-7 are still not in condition for allowance; the claim rejections are further discussed below.

The Applicant alleges, "In anticipation of the Examiner substituting ..." in pages 5-6, and states respectively that the prior art reference Tretter does not teach a Bayesian network which produces a result with evidence missing and therefore if the Examiner substitutes the Vivarelli article with a reference that does teach that claim limitation, the Examiner is using hindsight to modify the Tretter publication. Firstly, the Examiner disagrees as discussed above and does believe that Tretter suggests a neural network configured to produce the final estimate of image class with evidence missing and therefore the Vivarelli reference is only used as a secondary reference to further suggests that Tretter's neural network may be a Bayesian neural network.

Secondly as discussed above, the inventor clearly admits in the Declaration under 37 C.F.R. 1.132 that a Bayesian network is trained to be able to perform when data of input information is missing which further supports the Examiner's obviousness rejection.

Thirdly, in response to applicant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Therefore claims 1-3, and 5-7 are still not in condition for allowance; the claim rejections are further discussed below.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tretter (US 2002/0140843 A1, as applied in previous Office Action) in view of Vivarelli ("Using Bayesian neural networks to classify segmented images" - IEEE - July 1997, pages 268-273, as applied in previous Office Action).

Re Claim 1: Tretter discloses a method for scene classification / content-based and metadata based classification (see abstract, lines 1-3) of a digital image comprising the steps of (a) extracting one or more pre-determined camera metadata tags / meta data from the digital image (see abstract, lines 6-10, paragraph [0008], lines 9-12, meta-data may consist of but not limited to an automatic gain setting, film speed, shutter speed, white balance, aperture/lens index, focusing distance, date, time, and flash/no flash [at least 9 different meta-data's]); (b) obtaining an estimate of image class / meta data based classification based on (1) the extracted camera metadata tags / meta data (see abstract, lines 1-3, 10-14, paragraph [0008], lines 15-20) and not (2) image content features (paragraph [0008] shows that the meta-data classifier only uses data capturing attributes such as shutter speed, focusing distance, date and time, flash/no flash), thereby providing a metadata-based estimate / meta-data based classification; (c) obtaining, separately from the metadata-based estimate (paragraphs [0003]-[0004] and [0009] shows that the content based classification only uses content of the subject data such as color and contrast) another estimate of image class / content based classification of the digital image based on (1) image content features / content based data (see abstract, lines 1-3, 10-14, paragraph [0008], lines 15-20) and not (2) the extracted camera metadata tags (paragraphs [0003]-[0004] and [0009] show that the content based classification only uses content of the subject data such as color and contrast), thereby providing an image content-based estimate / content based classification; and (d) producing a final estimate of image class / combination of both results of the content based classifier and meta data based classifier of the digital image

based on a combination of the metadata-based estimate / meta data based classification and the image content-based estimate / content based classification (see abstract, lines 10-14, paragraph [0008], lines 15-20), wherein the combination in step (d) is obtained by using a network / nodal neural network (see paragraph [0032], lines 6-11) configured to produce the final estimate of image class with evidence missing / missing meta-data evidence (see paragraph [0029], lines 7-10, paragraph [0008], lines 9-12, Tretter's neural network consists of several nodes and each node is configured to receive for example one meta-data [focusing distance for example, other meta-data may consist of but not limited to an automatic gain setting, film speed, shutter speed, white balance, aperture/lens index, focusing distance, date, time, and flash/no flash {at least 9 different meta-data}], Tretter's number of nodes depends on the desired accuracy for the classification scheme that the neural network produces {see paragraph [0033], lines 1-6} and Tretter gives an example of having a neural network consisting of six decision-making nodes for a specific desired accuracy {see paragraph [0033], lines 1-6}, therefore if Tretter wanted a specific desired accuracy which required 6 nodes [each node requires one different meta-data such as focusing distance for example as discussed above], there would definitely be at least 3 different meta-data tags from the at least 9 which would not be addressed and therefore the neural network would be missing at least 3 different meta-data tag evidence).

However, Tretter fails to specifically suggest that the network is a Bayesian network.



Vivarelli discloses the network (Tretter's nodal neural network) is obtained by using a Bayesian neural network (see page 269, section BAYESIAN TRAINING OF NEURAL NETWORKS, paragraphs 1-2, Vivarelli's Bayesian neural network can replace Tretter's nodal neural network analysis for a final classification of a digital image).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tretter's method using Vivarelli's teachings of making a final classification using a combination of both content based and meta data based classification through nodal neural analysis (see Tretter, paragraph [0009], lines 1-11, paragraph [0010], lines 1-5) by replacing it with a Bayesian neural network in order to further improve the accuracy of the classification by applying the appropriate contribution weights to the two classifiers (Tretter's content based and meta-data based classification).

Further, the inventor Jiebo Luo in the Declaration under 37 C.F.R. 1.132 filed 10/09/2007, clearly states that a conventional Bayesian network is trained to be able to perform when data of input information is missing [see Declaration, page 1, Point 7]. Therefore the inventor clearly admits that the amended limitation is conventional in that a Bayesian network may perform with evidence missing.

Re Claim 2: Tretter further discloses the metadata extracted in step (a) includes one or more of exposure time, aperture, shutter speed, brightness value, subject distance / focusing distance and flash fired / flash - no flash (see abstract, lines 6-10, paragraph [0008], lines 9-12).

Re Claim 3: Tretter further discloses the image content features in step (c) include one or more of color, texture and semantic features (see paragraph [0003], lines 7-8, paragraph [0008], lines 1-3, paragraph [0025], lines 6-11).

As to claim 5, the claim is the corresponding computer readable medium for storing a program claim to claim 1 respectively. The discussions are addressed with regard to claim 1.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tretter, as modified by Vivarelli, and in further view of Schroder et al (US 7,020,330 B2, as applied in previous Office Action). The teachings of Tretter as modified by Vivarelli have been discussed above.

However, Tretter as modified by Vivarelli fails to disclose or fairly suggest applying a customized image enhancement procedure to the digital image in response to the final estimate of image class of the digital image.

Schroder discloses applying a customized image enhancement procedure / color correction process for assigned image class (3) to the digital image in response to the final estimate of image class (2) of the digital image (see Fig. 1, abstract, lines 8-11).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Tretter's method, as modified by Vivarelli, by using Schroder's teachings by including the application of applying a customized

image enhancement procedure after image classification in order to apply the color correction process which is most likely for a particular image belonging to a particular selected image class (see Schroder, col. 3, lines 10-12).

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tretter as modified by Vivarelli and Schroder, and further in view of Cooper ("A novel approach to color cast detection and removal in digital images" - SPIE - Jan 2000, vol 3963, pages 167-177, as applied in previous Office Action). The teachings of Tretter as modified by Vivarelli and Schroder have been discussed above.

However, Tretter as modified by Vivarelli and Schroder fails to disclose or fairly suggest the customized image enhancement procedure is color balancing and the customized image enhancement procedure includes retaining or boosting brilliant colors in images classified as sunset scenes and removing warm-colored cast from indoor images classified as tungsten-illuminated scenes.

Cooper discloses the customized image enhancement procedure is color balancing / color cast due to illuminant sources removal and the customized image enhancement procedure includes retaining or boosting brilliant colors in images classified as sunset scenes / cast removal from outdoor sunset conditions and removing warm-colored cast from indoor images / cast removal from indoor natural images classified as tungsten-illuminated / unusual illuminant scenes (see title, abstract, line 1, section 7 - RESULTS, paragraph 1, lines 5-6, paragraph 2, lines 1-3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Tretter's method, as modified by Vivarelli and Schroder, using Cooper's teachings by including the color correcting color cast removal feature in order to correct the color cast which is encountered in indoor and outdoor images such as sunset images (see Cooper, section 7 - RESULTS, paragraph 1, lines 5-6).

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Regazzoni discloses a Bayesian Network automatically deals with missing data.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Krasnic whose telephone number is (571) 270-1357. The examiner can normally be reached on Mon-Thur 8:00am-4:00pm and every other Friday 8:00am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Bernard Krasnic  
January 22, 2008



JINGGE WU  
SUPERVISORY PATENT EXAMINER